This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method of determining a first actual profile associated with a first grating comprising:

receiving a set of measurements associated with a signal indicative of diffraction from the grating;

generating <u>a first</u> actual spectrum signal data associated with the grating;

selecting a first trial profile;

generating a first trial spectrum signal data associated with the first trial profile;

comparing the first trial spectrum signal data to the first actual spectrum signal data; ~~and~~

determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile<u>; and</u>

<u>storing the second trial profile and the second sample trial spectrum signal data in a dynamic library of profiles</u>.

Claim 2 (original): The method of claim 1, wherein the at least one optimization technique includes at least one member selected from the group consisting of a global optimization technique and a local optimization technique.

Claim 3 (Original): The method of claim 1, further comprising:

using the at least one optimization technique to generate a plurality of additional trial profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated matches the actual profile more closely than previously generated additional sample profiles.

Claim 4 (canceled).

Claim 5 (currently amended): The method of claim 3, further comprising:

storing ~~the first trial profile, the second trial profile,~~ the additional trial profiles, ~~the first trial parameter set, the second trial spectrum signal data,~~ and the additional trial spectrum signal data ~~to a~~ in the dynamic library of profiles.

Claim 6 (original): The method of claim 5, further comprising:

determining a second actual profile associated with a second grating, including:

receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

Claim 7 (original): The method of claim 6, wherein the step of determining the second actual profile further comprises:

searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

retrieving a matching profile associated with the matching spectrum signal data.

Claim 8 (currently amended): The method of claim 6, wherein the step of determining the second actual profile further comprises:

searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

determining a closest matching spectrum signal data stored in the ~~temporary~~ dynamic library of profiles to the second actual spectrum signal data;

retrieving a closest matching profile associated with the closest matching spectrum signal data; and

using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

Claim 9 (original): The method of claim 1, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

Claim 10 (original): The method of claim 1, wherein the at least one optimization technique includes a steepest descent technique.

Claims 11-13 (canceled).

Claim 14 (original): A method of determining a profile associated with a grating, comprising:

receiving a measured signal;

selecting a set of trial parameter values;

determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

storing the set of trial parameter values in the database,

performing an electromagnetic simulation associated with the set of trial parameter values;

generating a simulated signal, and

storing the simulated signal in the database or another storage medium.

Claim 15 (original): The method of claim 14, further comprising:

comparing the simulated signal to the measured signal.

Claim 16 (currently amended): The method of claim 14, wherein the set of trial parameter values is associated with a set of one or more trial parameters, wherein the set of one or more trial parameters includes at least one member selected from a top ed critical dimension (CD), a bottom ed CD, a sidewall angle, and a thickness.

Claim 17 (original): The method of claim 15, wherein the step of comparing includes determining whether the trial signal satisfies a goodness of fit criterion.

Claims 18-21 (canceled).

Claim 22 (currently amended): A method of determining a profile, comprising:

receiving a set of measurements associated with an actual signal;

searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

determining whether the trial signal satisfies a goodness of fit threshold;

~~and~~ if the trial signal satisfies the threshold, displaying the closest matching set of trial parameter values; and

if the trial signal does not satisfy the threshold, generating a new trial signal using the set of trial parameter values and storing the new trial signal in the profile library.

Claim 23 (original): The method of claim 22, wherein if the trial signal does not satisfy the threshold, communicating an error message.

Claim 24 (original): The method of claim 22, wherein if the trial signal does not satisfy the threshold, changing at least one parameter range associated with at least one of the trial parameter values.

Claim 25 (original): The method of claim 22, wherein if the trial signal does not satisfy the threshold, increasing at least one parameter range associated with at least one of the trial parameter values.

Claims 26-27 (canceled).

Claim 28 (currently amended): A computer program product for use in determining a first actual profile associated with a first grating, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the first actual profile;

computer readable program code for causing a computer to effect receiving a signal indicative of diffraction from the grating;

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computer readable program code for causing said computer to effect generating actual spectrum signal data associated with the grating;

computer readable program code for causing said computer to effect selecting a first trial profile;

computer readable program code for causing said computer to effect generating a first trial spectrum signal data associated with the first trial profile;

computer readable program code for causing said computer to effect comparing the first trial spectrum signal data to the first actual spectrum signal data; and

computer readable program code for causing said computer to effect determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile; and

computer readable program code for causing said computer to effect storing the second trial profile and the second sample trial spectrum signal data in a dynamic library of profiles.

Claim 29 (currently amended): An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing determining a first actual profile associated with a first grating, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a signal indicative of diffraction from the grating;

computer readable program code for causing said computer to effect generating actual spectrum signal data associated with the grating;

computer readable program code for causing said computer to effect selecting a first trial profile;

computer readable program code for causing said computer to effect generating a first trial spectrum signal data associated with the first trial profile;

computer readable program code for causing said computer to effect comparing the first trial spectrum signal data to the first actual spectrum signal data; and

computer readable program code for causing said computer to effect determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile; and

computer readable program code for causing said computer to effect storing the second trial profile and the second sample trial spectrum signal data in a dynamic library of profiles.

Claim 30 (original): The computer program product of claim 28, further comprising:

computer readable program code for causing said computer to effect using the at least one optimization technique to generate a plurality of additional trial profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated more closely than previously generated additional sample profiles matches the actual profile.

Claim 31 (original): The article of manufacture of claim 29, further comprising:

computer readable program code for causing said computer to effect using the at least one optimization technique to generate a plurality of additional trial profiles, each of the plurality of additional trial profiles having an associated additional trial spectrum signal data, wherein each additional trial profile generated more closely than previously generated additional sample profiles matches the actual profile.

Claims 32-33 (canceled).

Claim 34 (currently amended): The computer program product of claim 30, further comprising:

computer readable program code for causing said computer to effect storing ~~the first trial profile, the second trial profile,~~ the additional trial profiles, ~~the first trial parameter set, the second trial spectrum signal data,~~ and the additional trial spectrum signal data ~~to a~~ in the dynamic library of profiles.

Claim 35 (currently amended): The article of manufacture of claim 31, further comprising:

computer readable program code for causing said computer to effect storing ~~the first trial profile,~~ the second trial profile, the additional trial profiles, ~~the first trial parameter set, the second trial spectrum signal data,~~ and the additional trial spectrum signal data ~~to a~~ in the dynamic library of profiles.

Claim 36 (original): The computer program product of claim 34, further comprising:

computer readable program code for causing said computer to effect determining a second actual profile associated with a second grating, including:

computer readable program code for causing said computer to effect receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

computer readable program code for causing said computer to effect comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

Claim 37 (original): The article of manufacture of claim 35, further comprising:

computer readable program code for causing said computer to effect determining a second actual profile associated with a second grating, including:

computer readable program code for causing said computer to effect receiving a second set of measurements to obtain a second actual spectrum signal data associated with the second grating; and

computer readable program code for causing said computer to effect comparing the second actual spectrum signal data to one or more of the spectrum signal data stored in the dynamic library of profiles.

Claim 38 (original): The computer program product of claim 36, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

computer readable program code for causing said computer to effect retrieving a matching profile associated with the matching spectrum signal data.

Claim 39 (original): The article of manufacture of claim 37, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if a matching spectrum signal data is found,

computer readable program code for causing said computer to effect retrieving a matching profile associated with the matching spectrum signal data.

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Claim 40 (currently amended): The computer program product of claim 36, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

computer readable program code for causing said computer to effect determining a closest matching spectrum signal data stored in the ~~temporary~~ <u>dynamic</u> library of profiles to the second actual spectrum signal data;

computer readable program code for causing said computer to effect retrieving a closest matching profile associated with the closest matching spectrum signal data; and

computer readable program code for causing said computer to effect using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

Claim 41 (currently amended): The article of manufacture of claim 37, wherein the step of determining the second actual profile further comprises:

computer readable program code for causing said computer to effect searching the spectrum signal data stored in the dynamic library of profiles for a match with the second actual spectrum signal data, wherein the match satisfies a preset criteria set, and if no matching spectrum signal data is found,

computer readable program code for causing said computer to effect determining a closest matching spectrum signal data stored in the ~~temporary~~ <u>dynamic</u> library of profiles to the second actual spectrum signal data;

computer readable program code for causing said computer to effect retrieving a closest matching profile associated with the closest matching spectrum signal data; and

computer readable program code for causing said computer to effect using at least one of the at least one optimization techniques to iteratively generate additional trial profiles increasingly closer in matching the second actual profile.

Claim 42 (original): The computer program product of claim 28, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

Claim 43 (original): the article of manufacture of claim 29, wherein the set of measurements includes at least one member selected from the group consisting of reflectivity and change in polarization states.

Claims 44-47 (canceled).

Claim 48 (original): A computer program product for use in determining a profile associated with a grating, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the profile;

computer readable program code for causing a computer to effect receiving a measured signal;

computer readable program code for causing said computer to effect selecting a set of trial parameter values;

computer readable program code for causing said computer to effect determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

computer readable program code for causing said computer to effect searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

computer readable program code for causing said computer to effect storing the set of trial parameter values in the database;

computer readable program code for causing said computer to effect performing an electromagnetic simulation associated with the set of trial parameter values;

computer readable program code for causing said computer to effect generating a simulated signal; and

computer readable program code for causing a computer to effect storing the simulated signal in the database or another storage medium.

Claim 49 (original): An article of manufacture comprising:

a computer usable medium including computer readable program code embodied therein for causing determining a profile associated with a grating, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a measured signal;

computer readable program code for causing said computer to effect selecting a set of trial parameter values;

computer readable program code for causing said computer to effect determining whether the set of trial parameter values is stored in a database, wherein if the set of trial parameter values is stored in the database,

computer readable program code for causing said computer to effect searching the database for a trial signal associated with the set of trial parameter values,

and wherein if the set of trial parameter values is not stored in the database,

computer readable program code for causing said computer to effect storing the set of trial parameter values in the database;

computer readable program code for causing said computer to effect performing an electromagnetic simulation associated with the set of trial parameter values;

computer readable program code for causing said computer to effect generating a simulated signal; and

computer readable program code for causing said computer to effect storing the simulated signal in the database or another storage medium.

Claim 50 (original): The computer program product of claim 48, further comprising:

computer readable program code for causing said computer to effect comparing the trial signal to the measured signal, wherein the step of comparing includes:

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit criterion.

Claim 51 (original): The article of manufacture of claim 49, further comprising:

computer readable program code for causing said computer to effect comparing the trial signal to the measured signal, wherein the step of comparing includes:

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit criterion.

Claims 52-57 (canceled).

Claim 58 (currently amended): A computer program product for use in determining a profile, said computer program product comprising:

a computer usable medium including computer readable program code embodied in said medium for causing determining the profile;

computer readable program code for causing a computer to effect receiving a set of measurements associated with an actual signal;

computer readable program code for causing said computer to effect searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit threshold,

and if the trial signal satisfies the threshold:

computer readable program code for causing said computer to effect displaying the closest matching set of trial parameter values, and

if the trial signal does not satisfy the threshold:

computer readable program code for causing said computer to effect generating a new trial signal using the set of trial parameter values and storing the new trial signal in the profile library.

Claim 59 (currently amended): An article of manufacture comprising:

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a computer usable medium including computer readable program code embodied therein for causing determining a profile, the computer readable program code in said article of manufacture comprising:

computer readable program code for causing a computer to effect receiving a set of measurements associated with an actual signal;

computer readable program code for causing said computer to effect searching a profile library for a closest matching set of trial parameter values, wherein the set of trial parameter values is associated with a trial signal;

computer readable program code for causing said computer to effect determining whether the trial signal satisfies a goodness of fit threshold,

~~and~~ if the trial signal satisfies the threshold:

computer readable program code for causing said computer to effect displaying the closest matching set of trial parameter values, and

if the trial signal does not satisfy the threshold:

computer readable program code for causing said computer to effect generating a new trial signal using the set of trial parameter values and storing the new trial signal in the profile library.

Claim 60 (original):   The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect communicating an error message.

Claim 61 (original):   The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect communicating an error message.

Claim 62 (original): The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect changing at least one parameter range associated with at least one of the trial parameter values.

Claim 63 (original):   The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect changing at least one parameter range associated with at least one of the trial parameter values.

Claim 64 (original): The computer program product of claim 58, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect increasing at least one parameter range associated with at least one of the trial parameter values.

Claim 65 (original): The article of manufacture of claim 59, wherein if the trial signal does not satisfy the threshold,

computer readable program code for causing said computer to effect increasing at least one parameter range associated with at least one of the trial parameter values.

Claims 66-69 (canceled).

Claim 70 (currently amended): A system for determining a first actual profile associated with a first grating comprising:

means for receiving a set of measurements associated with a signal indicative of diffraction from the grating;

means for generating actual spectrum signal data associated with the grating;

means for selecting a first trial profile;

means for generating a first trial spectrum signal data associated with the first trial profile;

means for comparing the first trial spectrum signal data to the first actual spectrum signal data; and

means for determining parameter values for a second trial profile using at least one optimization technique, wherein the second trial profile is associated with a second sample trial spectrum signal data, and wherein the second trial profile matches the first actual profile more closely than the first trial profile; and

means for storing the second trial profile and the second sample trial spectrum signal data in a dynamic library of profiles.